Trend Study 14-15-99

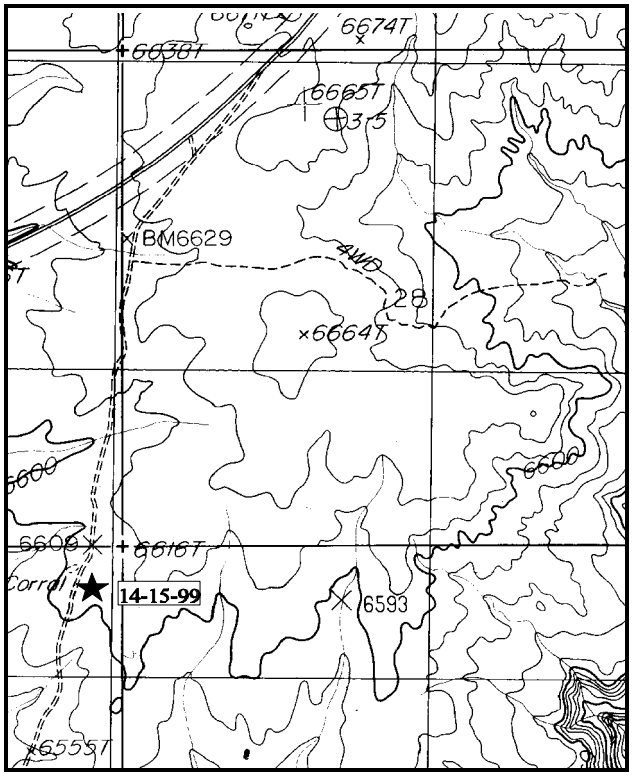
Study site name: Harmony Flat . Range type: Chained, Cabled, Seeded P-J

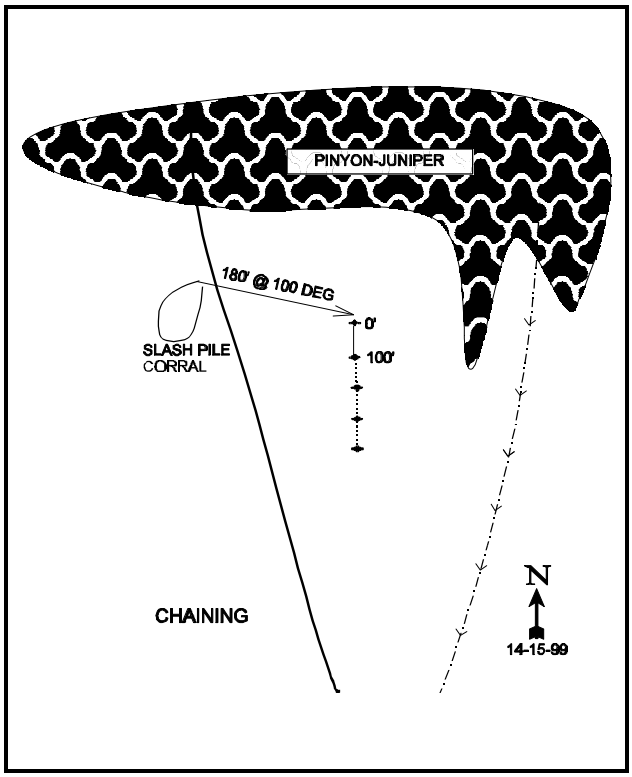
Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11& 71ft), line 2 (34ft), line 3 (59ft) line 4(71ft).

LOCATION DESCRIPTION

From the intersection of SR 95 and the road to Natural Bridges National Monument, go approximately 3 miles southwest on Route 95. At a point 0.4 miles beyond mile marker 89, look for a dirt road going straight off to the left before SR 95 makes a bend to the right. Follow the dirt road (Road #231a) south for 0.2 miles to a gate, staying left and continuing another 0.2 miles to a fork. Stay left and continue 0.8 miles to a corral made out of slash from the chaining. The transect starts on the opposite (left) side of the road. Park by the corral and walk 180 feet east to the starting point of the frequency baseline. The transect stakes are all 3-foot tall green and white fence posts.





Map Name: Kane Gulch Diagrammatic Sketch

Township 37S , Range 18E , Section 32 UTM 4154275.191 N, 592911.595 E

DISCUSSION

Trend Study No. 14-15 (36-3)

Harmony Flat is considered an important wintering area for deer coming off the south end of Elk Ridge and the Abajo Mountains. It is a large flat of intermixed pinyon-Juniper woodlands and sagebrush parks. Much of the woodland has been chained. The trend study is set up in the old BLM chaining. The site has an aspect which is generally south with a gentle slope of 2% to 8%. The area drains south into Grand Gulch. Elevation is 6,600 feet.

Crested wheatgrass is the principal forage species for cattle. According to the BLM, past use of the area usually consisted of 600 cattle trailing through every spring from about May 5 to June 5. However, cattle were observed trespassing in the area on July 22 when the transect was being set up in 1986. The Harmony Flat pellet group trend transect measures generally light to moderate deer use with an average of 13 deer days use/acre (32 ddu/ha) since 1975 (Jense et al. 1992; DWR 1998). The pellet group transect, like the Interagency range trend study, is at an elevation of 6,600 feet. Pellet group data taken along the study site baseline in 1999 estimate 21 deer days use/acre (52 ddu/ha) and 19 cow days use/acre (47 cdu/ha). Some of the cattle pats were fresh, while the majority were from last season. All of the deer pellet groups appear to be from the previous winter. Rabbit sign is very common.

Soil at the site is a deep sandy clay loam with a slightly alkaline pH (7.4). Effective rooting depth is estimated at nearly 15 inches. The soil is very compact, which makes it difficult to accurately measure effective rooting depth. There is virtually no rock on the surface or within the soil profile, so no rock index data is available. There is a slight hardpan at about 12 inches in depth, although it does not appear to be hard or thick enough to be a thoroughly consistent root barrier. The soil temperature is relatively high at almost 72°F at an average depth of about 15 inches. Soil erosion is a bit of a problem on this site. In 1986, heavy rains for two days previous to data collection caused fresh rill and gully erosion. Sheet erosion was also evident and many grasses were pedestalled by loss of the surrounding soil. The fine, sandy loam bare soil occupied 47% of the ground surface in 1986, and remained at that high level in 1999. The lack of consistent cover, cattle trails, and trampling escalates erosion. Large quantities of litter left from the chaining still provides important soil protection and also protects some grasses from excessive grazing. However, chaining litter cover is slowly declining with time, from a cover value of 50% in 1986 to 35% by 1999.

Young juniper and pinyon continue to occupy the site which was treated more than twenty years ago. They currently average 6-8 feet in height and probably represent mostly the small trees that survived the chaining. Pinyon and juniper are common, but none were encountered on the density plots in 1986, so plants/acre were not estimated. Point quarter data from 1999 estimate 91 juniper and 47 pinyon trees/acre. Average diameter of juniper is 2.5 inches while that of pinyon is 3 inches. Forty percent of the juniper trees sampled were previously knocked down (tipped over) but still living from the chaining treatment. They have an average diameter of nearly 6 inches. Since 1992, juniper cover has declined slightly while pinyon cover has increased from less than 1/4 of 1% to just over 1%. Both tree species currently provide 19% of the browse cover.

The most abundant browse and also key species for the site is Wyoming big sagebrush. It provided 83% of the browse cover in 1992, and 81% in 1999. Seed production was low in 1986, with a moderately dense population of 5,198 plants/acre which contained 44% mature plants. The young age class made up 28% of the population. Biotic potential (proportion of seedlings to the population) was fairly low at only 2%. Utilization was mostly light, vigor normal, and percent decadence was 28%. Density remained similar in 1992, but utilization was heavier with 56% of the population moderately browsed and 25% heavily utilized. Vigor was good however, with percent decadence declining to only 2%. Data from 1999 shows similar use, moderate to heavy use. Density has declined primarily due to a reduction in young plants. Vigor is considered poor on 11% of the plants sampled and percent decadence has increased to 30%. Other palatable browse species, ephedra and four-wing saltbush, are uncommon and are understandably browsed heavily.

Another plant that has been heavily utilized is crested wheatgrass. Except for scattered protected plants, most had been grazed down to a height of 2-4 inches in 1986. No regrowth had yet occurred by July of 1986 when the transects were set up. Density for crested wheatgrass appeared to be low for a seeded area. Other grasses were much less common and provide little forage, but included western wheatgrass, smooth brome, and bottlebrush squirreltail. Data from 1999 show that crested wheatgrass has remained at a stable nested frequency value, but the only other perennial grass found on the site is a few bottlebrush squirreltail. Utilization was evident in 1999, at a level of 30% to 40% on individual plants. Use was inconsistent however. Forbs are uncommon. A few palatable species, dusty penstemon and seeded alfalfa, were severely hedged in 1986. Alfalfa was not found in 1992 or 1999.

1986 APPARENT TREND ASSESSMENT

The reestablishment and/or release of pinyon-Juniper in the treatment area, poor sagebrush vigor, lack of vegetative diversity, and heavy grazing by cattle would indicate a downward vegetative trend. The Wyoming big sagebrush will maintain itself in the stand, but production is low and apparently with low palatability. Steps should be taken to restrict season-long grazing in order to maintain vigor on the crested wheatgrass and allow enough forage for wildlife in early spring. The soil trend is also down due to a lack of ground cover and high erodibility.

1992 TREND ASSESSMENT

Soil trend appears to be stable, but poor condition. The browse trend is stable with only a 3% loss in it's population, a decline in percent decadence from 28% to only 2%, and no plants were classified as having poor vigor. The herbaceous understory would be judged stable. The most dominant species, crested wheatgrass, has remained at a similar nested frequency compared to 1986. There are few if any other perennial grasses on the site worthy of note. In 1986, there was only one forb found (alfalfa), which had been seeded with crested wheatgrass. By 1992, the seeded alfalfa could not be found on site, but there were eight forbs of which the majority was made up by the annual, Wright's birdbeak. The site still lacks diversity because the community is basically composed of only two species, Wyoming big sagebrush and crested wheatgrass.

TREND ASSESSMENT
soil - stable, but poor condition
browse - stable
herbaceous understory - stable but poor

1999 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1992. Erosion is still a problem however, and there is a considerable unprotected bare soil. Trend for browse is down slightly. Utilization is similar to 1992, but density has declined, more plants are showing poor vigor, recruitment is down, and percent decadence has increased from 2% to 30%. It does not appear that the population will continue to decline in density however. Trend for the herbaceous understory is stable. Nested frequency of the only common herbaceous species, crested wheatgrass, has remained stable since 1992. Sum of nested frequency of perennial forbs has declined slightly, but forbs are so rare that they account for very little cover.

TREND ASSESSMENT
soil - stable but in poor condition
browse - down slightly
herbaceous understory - stable but poor

HERBACEOUS TRENDS --
Herd unit 14 , Study no: 15

Type	Species	Nested Frequency '86	'92	'99	Quadrat Frequency '86	'92	'99	Average Cover % '92	'99
G	Agropyron cristatum	235	227	228	84	78	78	10.14	8.51
G	Agropyron smithii	$_{b}$3	$_{a}$-	$_{a}$-	3	-	-	-	-
G	Bromus inermis	4	1	-	2	1	-	.00	-
G	Sitanion hystrix	3	-	2	2	-	1	-	.00
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		245	228	230	91	79	79	10.14	8.51
Total for Grasses		245	228	230	91	79	79	10.14	8.51
F	Astragalus convallarius	$_{a}$-	$_{b}$5	$_{ab}$1	-	4	1	.09	.00
F	Chenopodium album (a)	-	2	-	-	1	-	.00	-
F	Collinsia parviflora (a)	-	-	1	-	-	1	-	.00
F	Cordylanthus wrightii (a)	-	$_{b}$134	$_{a}$-	-	57	-	5.47	-
F	Gilia spp. (a)	-	4	-	-	2	-	.01	-
F	Lomatium spp.	-	$_{B}$3	$_{a}$-	-	3	-	.01	-
F	Medicago sativa	$_{b}$14	$_{a}$-	$_{a}$-	6	-	-	-	-
F	Phlox longifolia	$_{a}$-	$_{b}$11	$_{b}$8	-	5	4	.02	.02
F	Streptanthus cordatus	-	2	-	-	1	-	.00	-
Total for Annual Forbs		0	140	1	0	60	1	5.48	0.00
Total for Perennial Forbs		14	21	9	6	13	5	0.13	0.02
Total for Forbs		14	161	10	6	73	6	5.62	0.02

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 14 , Study no: 15

Type	Species	Strip Frequency %92	%99	Average Cover % %92	%99
B	Artemisia tridentata wyomingensis	71	69	11.02	11.82
B	Atriplex canescens	0	0	-	-
B	Gutierrezia sarothrae	0	2	.03	.00
B	Juniperus osteosperma	6	6	2.03	1.43
B	Opuntia spp.	1	0	-	-
B	Pinus edulis	2	2	.18	1.31
Total for Browse		80	79	13.27	14.57

CANOPY COVER --
Herd unit 14 , Study no: 15

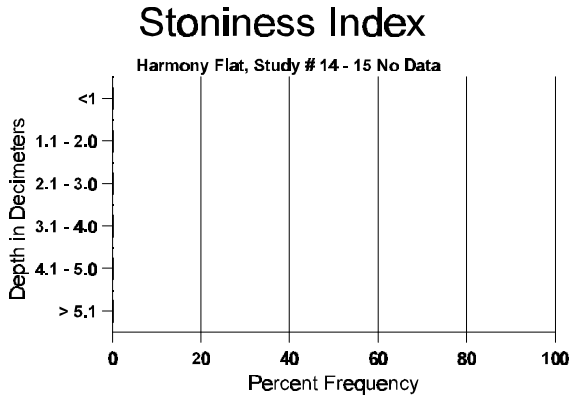
Species	Percent Cover ⁞99
Juniperus osteosperma	2

BASIC COVER --
Herd unit 14 , Study no: 15

Cover Type	Nested Frequency ⁞92	⁞99	Average Cover % '86	'92	'99
Vegetation	279	252	3.00	20.40	21.62
Rock	-	-	0	.38	0
Pavement	-	5	0	0	.01
Litter	263	361	50.00	37.43	34.76
Cryptogams	15	45	0	1.05	1.44
Bare Ground	237	337	47.00	44.36	47.77

SOIL ANALYSIS DATA --
Herd Unit 14, Study # 15, Study Name: Harmony Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.9	71.6 (14.5)	7.4	60.9	16.6	22.6	1.5	70.4	35.2	0.4



PELLET GROUP DATA --
Herd unit 14 , Study no: 15

Type	Quadrat Frequency ⁞92	⁞99
Rabbit	61	63
Deer	23	15
Cattle	3	8

Pellet Transect Days Use/Acre (ha) ⁞99
N/A
21 (52)
19 (47)

BROWSE CHARACTERISTICS --
Herd unit 14 , Study no: 15

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	92	-	-	-	-	-	-	5	-	-	5	-	-	-	100			5
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	86	22	-	-	-	-	-	-	-	-	22	-	-	-	1466			22
	92	15	54	13	5	1	-	1	4	-	93	-	-	-	1860			93
	99	1	9	7	-	-	-	-	-	-	17	-	-	-	340			17
M	86	31	3	-	-	-	-	-	-	-	34	-	-	-	2266	18	17	34
	92	21	85	47	-	1	-	-	-	-	154	-	-	-	3080	-	-	154
	99	9	64	24	-	4	8	-	-	-	102	-	7	-	2180	24	31	109
D	86	15	7	-	-	-	-	-	-	-	19	-	-	3	1466			22
	92	1	1	2	-	-	2	-	-	-	6	-	-	-	120			6
	99	2	22	26	-	3	1	-	-	-	42	-	6	6	1080			54
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	13%	00%	04%	- 3%
'92	56%	25%	00%	-29%
'99	57%	37%	11%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	5198	Dec:	28%
	'92	5060		2%
	'99	3600		30%

Atriplex canescens																		
D	86	-	-	-	-	-	-	-	-	1	1	-	-	-	66			1
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	100%	00%	
'92	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	100%
	'92	0		0%
	'99	0		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	6	2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'92	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		-
'92	0			-
'99	40			-

Juniperus osteosperma																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	-	-	6
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'92	00%	00%	00%	+14%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	0	Dec:	0%
'92	120		17%
'99	140		0%

Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	21	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'92	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	0	Dec:	-
'92	20		-
'99	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'92	00%	00%	00%	+ 0%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'92	40		-
	'99	40		-